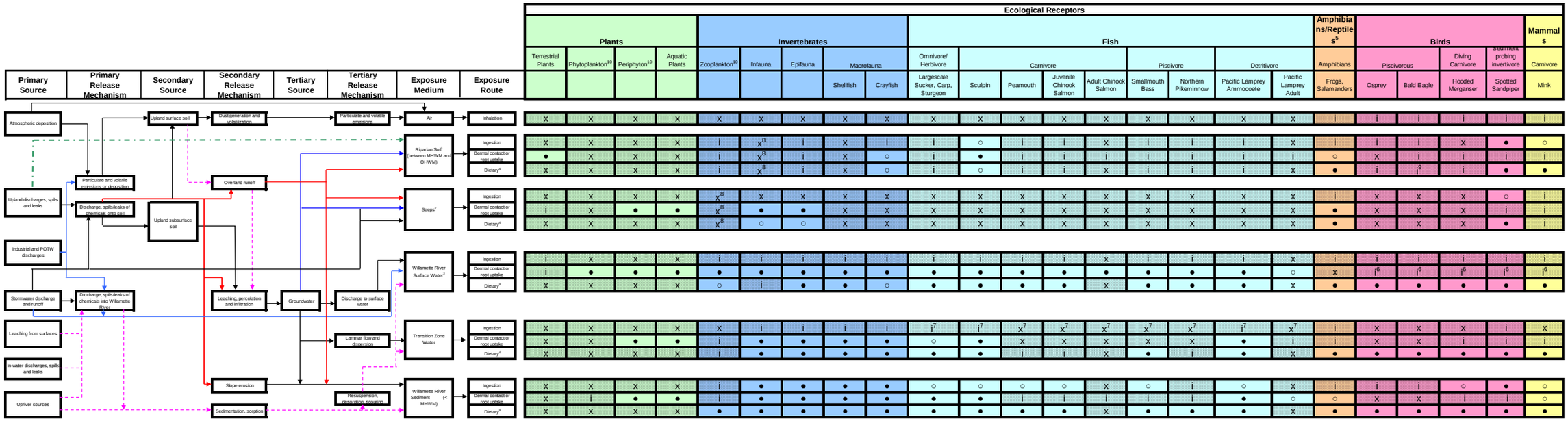
Figure 4 - Conceptual Site Model for the Ecological Risk Assessment



Legend

- ● = Complete and significant pathway
- ○ = Complete and significance unknown
- i = Complete and insignificant pathway
- x = Incomplete pathway
- MHWM = mean high water mark
- OHWM = ordinary high water mark

The absence of shading indicates a complete pathway.

Complete and Significant

The following criteria should be met before the pathway of a contaminant should be considered complete and significant:

- The pathway is theoretically or potentially complete; pathway can be supported by the scientific literature .
- Both the receptor and the exposure media are known, based on site-specific information, or can reasonably be assumed to co-occur in Portland Harbor.
- The pathway has been shown to be a primary route of exposure for any life stage of a receptor or surrogate organism based on laboratory, field, or site-specific data, and there is a high potential that the receptor will receive a significant proportion of the contaminant dose via the proposed route.

For example, exposure of fish to dissolved metals via uptake through the gill, and exposure of fish-eating birds to PCBs by consuming contaminated prey.

Pathways that are complete and significant will be assessed quantitatively. For example, the concentration of metals measured in the water column will be compared to concentrations shown to cause adverse effects to fish (in the scientific literature) to calculate a hazard quotient. If information needed to calculate a hazard quotient is not available, the preference will be to collect the needed information. If the information cannot be collected, a conservative value will be used in the hazard quotient calculation.

Complete and Significance Unknown

A pathway should be classified as complete and significance unknown if it meets the following criteria:

- The pathway is theoretically or potentially complete; pathway can be supported by the scientific literature.
- Both the receptor and the exposure media are assumed to co-occur in the Portland Harbor, but it is unknown whether or not the receptor uses the area sufficiently enough to be exposed to contaminants at effect levels.
- The pathway has been shown to be a primary route of exposure for any life stage of a receptor or surrogate organism, but no laboratory, field or site-specific data are available to indicate that the receptor will receive a significant proportion of the contaminant dose.
- It is unknown if the receptor will receive a significant proportion of the contaminant dose when combined with other pathways or contaminants.

For example, it is unknown how sturgeon use Portland Harbor. While exposure to sediment is likely, data are not available to assess quantitatively the extent that this receptor and exposure media co-occur.

For pathways that are classified as complete and significance unknown, additional site-specific data will be required to determine if they can be reclassified as complete and significant or complete and insignificant.

Complete and Insignificant

A pathway should be classified as complete and insignificant if it meets the following criteria:

- The pathway is theoretically or potentially complete; pathway can be supported by the scientific literature.
- The pathway is known to be a primary route of exposure for any life stage of a receptor or surrogate organism. However, laboratory, field or site-specific data indicate contaminants are unlikely to contribute a significant proportion of the contaminant dose solely by the proposed route or pathway, or it can be reasonably assumed that data would demonstrate that exposure via the pathway is insignificant compared to other pathways.

For example, while theoretically freshwater fish ingest water when feeding they do not actively drink due to the osmotic conditions in which they exist. Therefore, exposure to surface water via ingestion would be minor relative to other pathways. Also, PCB uptake from the water column is probably a complete pathway for piscivorous birds, but compared to the uptake of PCBs in contaminated prey items, the exposure is not significant.

Pathways that are complete and insignificant will not be assessed unless additional data become available that changes the significance value. Studies will not be specifically designed to address the complete and insignificant pathway combination. A hazard quotient will be calculated if data are readily available, and some pathway/receptor combinations could be described in the uncertainty section.

Incomplete

A pathway should be classified as incomplete if it meets the following criteria:

- The pathway is theoretically and/or practically not possible or not likely to occur in the area evaluated.
- Both the receptor and the exposure media are known, based on site-specific data, or can reasonably be assumed not to co-occur in Portland Harbor or would not use the area to the extent where exposure would occur.
- The pathway is not a primary route of exposure for any life stage of a receptor or surrogate organism based on laboratory, field, or site-specific data.

For example, juvenile salmon would not be eating fish.

Pathways that are incomplete will not be assessed.

Definitions

A **Complete** pathway means there is a potential for a contaminant to reach a receptor via the proposed route.
An **Incomplete** pathway means there is no potential for a contaminant to reach a receptor via the proposed route.
A **Significant** pathway means there is a high potential that the receptor will receive a significant proportion of the contaminant dose via the proposed route.
An **Insignificant** pathway means there is a low potential that the receptor will receive a significant proportion of the contaminant dose via the proposed route.
Significance Unknown means that it is unknown if the receptor will receive a significant proportion of the contaminant dose via the proposed route alone. However, the receptor could receive a significant proportion of the contaminant dose when combined with other pathways or other contaminants.

Footnotes

[1]Riparian Soil = The bank area between the Mean High Water Mark (MHWM) and the Ordinary High Water Mark (OHWM). Upland soil above the Ordinary High Water Mark will be assessed by upland facilities under DEQ oversight.

[2]Seeps = Seeps is water discharging on the bank area above the MHWM. It inclues the in-point of small tributaries to the river, groundwater seeping up to the bank area, and small piped discharges running over the bank.

[3]Willamette River Surface Water includes fish bearing tributaries and the in-point of year-round, significant flow outfalls.

[4]Dietary = Dietary means any tissue that is consumed by the species of interest within the exposure medium, and it includes trophic transfer.

[5]Reptiles = There is likely limited use of the ISA by only a few reptiles (garter snake, painted turtle and pond turtle). We have no surrogate species for reptiles, but protecting sensitive life stages of amphibians and birds is considered protective of reptiles.

[6] Areas with significant sheen could be a "complete and significant" pathway.

[7] Fish exposure to discharging Transition Zone Water will be assessed by focused surface water sampling.

[8] This is a "complete and signficant" pathway for terrestrial invertebrates.

[9] This could be a "complete and significant" pathway for the terrestrial riparian area.

[10]These receptors will be assessed as potential pathways for contaminant movement through the food web. They will not be assessed as endpoints themselves.